Effect of pressure gradients in an industrial anaerobic digester

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Abstract:
An industrial scale granular anaerobic digester will be sampled at 7 different points along the vertical axis. Samples from the gas and the liquid phases are taken at the native pressure inside the bioreactor to ensure truthful gas and liquid composition. These samples will be analysed for a wide range of minerals (Ca, Mg), carbon-based compounds (COD fractions, VFA profile), nutrients (Nitrogen, Phosphorous), sulphur (sulphate, sulphite, sulphide) and biogas (methane, carbon dioxide, hydrogen, hydrogen sulphide). The study will reveal the effect of pressure gradients on the digesters overall performance. The generated data set will be used to calibrate and validate an ADM1-based model where pressure effects on gaseous compounds solubility and thermodynamic feasibility of reactions are included.